

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 3

In the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1-3. (canceled)

4. (currently amended) ~~The mixing head assembly of claim 3, wherein:~~ A mixing head assembly comprising:

a housing having an input mix chamber passageway and an output passageway, the input mix chamber passageway communicating with the output passageway;

a first input for injecting a first fluid into the input mix chamber passageway, the first input including a first nozzle configured to inject the first fluid into the input mix chamber passageway; and

a second input for injecting a second fluid into the input mix chamber passageway whereby the second fluid can mix with the first fluid to form a mixed fluid;

the input mix chamber passageway including an input annular cross section with an input axis; and

the outlet passageway including an outlet annular cross section with an outlet axis; wherein an angle between the input axis and the outlet axis is from about 89° to about 80°;

the second input includes a second nozzle configured to inject the second fluid into the input mix chamber passageway;

the first nozzle is configured to inject the first fluid into the input mix chamber passageway along a first axial line;

the second nozzle is configured to inject the second fluid into the input mix chamber passageway along a second axial line; and

the first axial line and the second axial line are not co-linear; and

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 4

a line perpendicular to the first axial line is not parallel to a longitudinal axis of the input mix chamber passageway and a line perpendicular to the second axial line is not parallel to the longitudinal axis of the input mix chamber passageway.

5. (previously presented) The mixing head assembly of claim 4, wherein:

the first nozzle and the second nozzle are configured to inject the first fluid and the second fluid into the input mix chamber passageway such that the first fluid and the second fluid meet at an intersection point; and

the intersection point is not located along the longitudinal axis of the input mix chamber passageway.

6-14. (canceled)

15. (previously presented) A mixing head assembly comprising:

a housing having an input mix chamber passageway and an output passageway, the input mix chamber passageway communicating with the output passageway;

a first nozzle for injecting a first fluid into the input mix chamber passageway; and

a second nozzle for injecting a second fluid into the input mix chamber passageway

whereby the second fluid can mix with the first fluid to form a mixed fluid;

the first nozzle being configured to inject the first fluid into the input mix chamber passageway along a first axial line;

the second nozzle being configured to inject the second fluid into the input mix chamber passageway along a second axial line;

wherein the first nozzle and the second nozzle are configured to inject the first fluid and the second fluid into the input mix chamber passageway such that the first fluid and the second fluid meet at an intersection point; and

wherein the first axial line and the second axial line are not co-linear;

wherein a line perpendicular to the first axial line is not parallel to a longitudinal axis of the input mix chamber passageway and a line perpendicular to the second axial line is not

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 5

parallel to the longitudinal axis of the input mix chamber passageway; and

wherein the intersection point is not located along the longitudinal axis of the input mix chamber passageway.

16. (original) The mixing head assembly of claim 15, wherein:  
the input mix chamber passageway is non-perpendicular to the output passageway.
17. (original) The mixing head assembly of claim 16, wherein:  
the input mix chamber passageway includes an input annular cross section with an input axis; and  
the outlet passageway includes an outlet annular cross section with an outlet axis.
18. (original) The mixing head assembly of claim 17, wherein:  
an angle between the input axis and the outlet axis is from about 89° to about 80°.
19. (original) The mixing head assembly of claim 18, wherein:  
the angle between the input axis and the outlet axis is about 88°.
20. (original) The mixing head assembly of claim 15, further including:  
a cleanout piston rod located in the outlet passageway configured to slide within the outlet passageway to push the mixed fluid in the outlet passageway out of the outlet passageway.
21. (previously presented) The mixing head assembly of claim 15, further including:  
a mixing chamber piston rod located in the input mix chamber passageway configured to slide within the input mix chamber passageway to push all of the mixed fluid in all of the input mix chamber passageway out of the input mix chamber passageway and into the outlet passageway.

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 6

22. (original) The mixing head assembly of claim 15, wherein:  
the housing includes a discharge outlet at an end of the outlet passageway;  
the input mix chamber passageway meets the outlet passageway at a meeting area;  
the first fluid mixes with the second fluid at a mixing area; and  
an angle between the input mix chamber passageway and the outlet passageway defined  
by the discharge outlet, the meeting area and the mixing area is acute.

23. (original) The mixing head assembly of claim 22, wherein:  
the angle between the input mix chamber passageway and the outlet passageway is from  
about 89° to about 80°.

24. (original) The mixing head assembly of claim 23, wherein:  
the angle between the input mix chamber passageway and the outlet passageway is  
about 88°.

25-27. (canceled)

28. (currently amended) ~~The method of mixing of claim 27, further including:~~ A method of mixing a first fluid and a second fluid in a mixing head assembly comprising:  
providing the mixing head assembly with a housing having an input mix chamber passageway and an output passageway, the input mix chamber passageway communicating with the output passageway;  
injecting the first fluid into the input mix chamber passageway through a first nozzle of a first input;  
injecting the second fluid into the input mix chamber passageway;  
mixing the first fluid with the second fluid to form a mixed fluid;  
providing the input mix chamber passageway with an input annular cross section having an input axis;

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 7

providing the outlet passageway with an outlet annular cross section having an outlet axis; and

angling the input axis and the outlet axis from about 89° to about 80°.

injecting the second fluid includes injecting the second input through a second nozzle.

injecting the first fluid comprises injecting the first fluid into the input mix chamber passageway along a first axial line; and

injecting the second nozzle comprises injecting the second fluid into the input mix chamber passageway along a second axial line; and

further including positioning the first axial line and the second axial line along lines that are not co-linear; and

positioning the first axial line and the second axial line to be non-parallel to a line perpendicular to a longitudinal axis of the input mix chamber passageway.

29. (previously presented) The method of mixing of claim 28, wherein:  
the first fluid and the second fluid meet at an intersection point; and  
further including positioning the intersection point at a position spaced from the longitudinal axis of the input mix chamber passageway.

30-41. (canceled)

42. (previously presented) A method of mixing a first fluid and a second fluid in a mixing head assembly comprising:

providing the mixing head assembly with a housing having an input mix chamber passageway and an output passageway, the input mix chamber passageway communicating with the output passageway;

injecting the first fluid along a first axial line into the input mix chamber passageway through a first nozzle;

injecting the second fluid along a second axial line into the input mix chamber passageway through a second nozzle;

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 8

mixing the first fluid with the second fluid to form a mixed fluid at an intersection point;

positioning the first axial line and the second axial line along lines that are not co-linear;

positioning the first axial line and the second axial line to be non-parallel to a line perpendicular to a longitudinal axis of the input mix chamber passageway; and

positioning the intersection point at a position spaced from the longitudinal axis of the input mix chamber passageway.

43. (original) The method of mixing of claim 42, further including:

angling the input mix chamber passageway relative to the output passageway at a non-perpendicular angle.

44. (original) The method of mixing of claim 43, wherein:

the input mix chamber passageway includes an input annular cross section with an input axis; and

the outlet passageway includes an outlet annular cross section with an outlet axis.

45. (original) The method of mixing of claim 44, wherein:

angling the input mix chamber passageway relative to the output passageway at a non-perpendicular angle includes angling the input axis and the outlet axis at the non-perpendicular angle, the non-perpendicular angle being from about 89° to about 80°.

46. (original) The method of mixing of claim 45, wherein:

the non-perpendicular angle is about 88°.

47. (original) The method of mixing of claim 43, wherein:

the housing includes a discharge outlet at an end of the outlet passageway;

the input mix chamber passageway meets the outlet passageway at a meeting area;

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 9

the first fluid mixes with the second fluid at a mixing area; and  
angling the input mix chamber passageway relative to the output passageway at the non-perpendicular angle comprises angling the input mix chamber passageway relative to the outlet passageway such that an exchange angle between the input mix chamber passageway and the outlet passageway defined by the discharge outlet, the meeting area and the mixing area is acute.

48. (original) The method of mixing of claim 47, wherein:  
the exchange angle is from about  $89^\circ$  to about  $80^\circ$ .
49. (original) The method of mixing of claim 48, wherein:  
the exchange angle is about  $88^\circ$ .
50. (original) The method of mixing of claim 42, further including:  
providing the housing with a cleanout piston rod located in the outlet passageway; and  
sliding the cleanout piston rod within the outlet passageway.
51. (original) The method of mixing of claim 50, further including:  
pushing the mixed fluid in the outlet passageway out of the outlet passageway.
52. (original) The method of mixing of claim 42, further including:  
providing the housing with a mixing chamber piston rod located in the input mix chamber passageway; and  
sliding the mixing chamber piston rod within the input mix chamber passageway.
53. (previously presented) The method of mixing of claim 52, further including:  
pushing all of the mixed fluid in the input mix chamber passageway out of all of the input mix chamber passageway and into the outlet passageway with the mixing chamber piston rod.

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 10

54. (original) The method of mixing of claim 42, wherein:  
the first fluid is polyol and the second fluid is isocyanate.

55. (previously presented) A mixing head assembly comprising:  
a housing having an input mix chamber passageway and an output passageway, the  
input mix chamber passageway communicating with the output passageway;  
a first nozzle for injecting a first fluid into the input mix chamber passageway, the first  
nozzle being configured to inject the first fluid into the input mix chamber passageway along a  
first axial line; and

a second nozzle for injecting a second fluid into the input mix chamber passageway  
whereby the second fluid can mix with the first fluid to form a mixed fluid, the second nozzle  
being configured to inject the second fluid into the input mix chamber passageway along a  
second axial line;

wherein the input mix chamber passageway is non-perpendicular to the output  
passageway;

wherein the first nozzle and the second nozzle are configured to inject the first fluid and  
the second fluid into the input mix chamber passageway such that the first fluid and the second  
fluid meet at an intersection point;

wherein the first axial line and the second axial line are not co-linear;

wherein a line perpendicular to the first axial line is not parallel to a longitudinal axis of  
the input mix chamber passageway and a line perpendicular to the second axial line is not  
parallel to the longitudinal axis of the input mix chamber passageway; and

wherein the intersection point is not located along the longitudinal axis of the input mix  
chamber passageway.

56. (previously presented) A method of mixing polyol and isocyanate in a mixing head  
assembly comprising:



Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 11

providing the mixing head assembly with a housing having an input mix chamber passageway and an output passageway, the input mix chamber passageway communicating with the output passageway;

angling the input mix chamber passageway relative to the output passageway at a non-perpendicular angle;

injecting the polyol along a first axial line into the input mix chamber passageway through a first nozzle;

injecting the isocyanate along a second axial line into the input mix chamber passageway through a second nozzle;

mixing the polyol with the isocyanate to form polyurethane foam at an intersection point;

positioning the first axial line and the second axial line along lines that are not co-linear;

positioning the first axial line and the second axial line to be non-parallel to a line perpendicular to a longitudinal axis of the input mix chamber passageway; and

positioning the intersection point at a position spaced from the longitudinal axis of the input mix chamber passageway.

57. (previously presented) A mixing head assembly comprising:

a housing having a passageway;

a first nozzle for injecting a first fluid into the passageway; and

a second nozzle for injecting a second fluid into the passageway whereby the second fluid can mix with the first fluid to form a mixed fluid;

the first nozzle being configured to inject the first fluid into the passageway along a first axial line;

the second nozzle being configured to inject the second fluid into the passageway along a second axial line;

Applicant : Gordon W. Breuker et al.  
Appl. No. : 10/600,777  
Page : 12

wherein the first nozzle and the second nozzle are configured to inject the first fluid and the second fluid into the passageway such that the first fluid and the second fluid meet at an intersection point; and

wherein the first axial line and the second axial line are not co-linear;

wherein a line perpendicular to the first axial line is not parallel to a longitudinal axis of the input mix chamber passageway and a line perpendicular to the second axial line is not parallel to the longitudinal axis of the input mix chamber passageway; and

wherein the intersection point is not located along the longitudinal axis of the passageway.

58. (previously presented) A method of mixing a first fluid and a second fluid in a mixing head assembly comprising:

providing the mixing head assembly with a housing having a passageway;

injecting the first fluid along a first axial line into the passageway through a first nozzle;

injecting the second fluid along a second axial line into the passageway through a second nozzle;

mixing the first fluid with the second fluid to form a mixed fluid at an intersection point;

positioning the first axial line and the second axial line along lines that are not co-linear;

positioning the first axial line and the second axial line to be non-parallel to a line perpendicular to a longitudinal axis of the input mix chamber passageway; and

positioning the intersection point at a position spaced from the longitudinal axis of the passageway.

59. (previously presented) The mixing head assembly of claim 15, wherein:

the first nozzle is configured to inject the first fluid to mix with the second fluid before either the first fluid or the second fluid enters the output passageway.

Applicant : Gordon W. Breuker et al.  
Appln. No. : 10/600,777  
Page : 13

60. (previously presented) The mixing head assembly of claim 15, wherein:  
the first nozzle and the second nozzle join the input mix chamber passageway in an area of the input mix chamber passageway that has a single diameter.
61. (previously presented) The mixing head assembly of claim 5, wherein:  
the first nozzle is configured to inject the first fluid to mix with the second fluid before either the first fluid or the second fluid enters the output passageway.
62. (previously presented) The mixing head assembly of claim 5, wherein:  
the first nozzle and the second nozzle join the input mix chamber passageway in an area of the input mix chamber passageway that has a single diameter.
63. (previously presented) The method of mixing of claim 42, further including:  
moving a mixture of the first fluid and the second fluid to the output passageway;  
wherein mixing the first fluid and the second fluid takes place before moving the mixture.
64. (previously presented) The method of mixing of claim 42, further including:  
joining the first nozzle and the second nozzle in an area of the input mix chamber passageway having a single diameter.
65. (previously presented) The method of mixing of claim 29, further including:  
moving a mixture of the first fluid and the second fluid to the output passageway;  
wherein mixing the first fluid and the second fluid takes place before moving the mixture.
66. (previously presented) The method of mixing of claim 29, further including:  
joining the first nozzle and the second nozzle in an area of the input mix chamber passageway having a single diameter.